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EXAMINER

REDDING, THOMAS M

ART UNIT PAPER NUMBER

2609

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/05/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/808,948

Applicant(s)

WASSERMAN, RICHARD M.

Examiner

Thomas M. Redding

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-10 and 12-22 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 6/3/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because of multiple informalities.
  - Reference 300E is described in figure 12 on page 27, line 9, but is not actually labeled in figure 12.
  - In figures 14 and 15 the word “Exteranous” is used. It would appear that the word intended was “Extraneous”.
  - In figure 15, box 1320 has the word pixels misspelled (“pexels”)
  - In figure 19, box 1714 has an extra line of text at the end (“MORE ROI”) that appears to be an incomplete deletion.
  - In figure 19, decision block 1746 appears to have the “YES” and “NO” labels reversed.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency.

Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The following quotation of 37 CFR § 1.72(b) is the basis of objection:

(b) A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract" or "Abstract of the Disclosure." The sheet or sheets presenting the abstract may not include other parts of the application or other material. The abstract in an application filed under 35 U.S.C. 111 may not exceed 150 words in length. The purpose of the abstract is to enable the United States Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure.

The abstract of the disclosure is objected to because of undue length. Correction is required. See MPEP § 608.01(b).

2. The disclosure is objected to because of the following informalities:

- Pages 19-22 make reference to several "pseudo-images" such as "600-A" and "700-B". These appear to be uncorrected references to an earlier drawing set and are now labeled as figures (e.g. "Fig. 6A") in the current drawing set. The specification should be updated to match the drawings.
- On page 21, line 11, the reference to the template 700-B should have referenced 700-A in the original drawing and Fig. 7A in the revised drawings (it was mis-referenced before the drawings were changed).

Appropriate correction is required.

***Claim Objections***

3. Claim 22 is objected to because of the following informalities:

Claim 22 is a method claim depending from an apparatus claim. From context it would appear that claim 22 was intended to be another apparatus claim and for the purposes of the remainder of this action claim 22 will be presumed to read as:

The **machine vision inspection system** of Claim 18, wherein the extraneous feature identifying portion comprises predetermined extraneous feature pixel identification operations, and the user interface includes features usable by an operator to determine at least one of S1) at least one subset of the predetermined extraneous feature pixel identification operations, to be applied to the workpiece image, and S2) at least one parameter that governs a predetermined extraneous feature pixel identification operation to be applied to a workpiece image, and the extraneous feature identifying portion identifies extraneous feature pixels based on the operator determination of at least one of S 1) and S2).

Appropriate correction is required.

***Claim Objections - 37 CFR 1.75(a)***

4. The following is a quotation of 37 CFR 1.75(a):

The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

5. Claims 11 and 21 are objected to under 37 CFR 1.75(a), as failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention or discovery.

Regarding claim 11, the phrase "appropriate manner" is vague and indefinite.

Regarding claim 21, It would seem that this claim is intended to associate the ROI (defined in claim 18) to a widget associated with the video tool (also defined in claim 18) and additionally associate the mode control or operating status feature described in claim 20 to another widget associated with the same tool. The way it is currently worded is quite repetitive and if a) and b) when it first appears is intended to reference the definitions in claim 20, the subsequent use of a) and b) at the end of claim 21 are inconsistent in that they appear to flip the definitions (i.e. what was a) is now defined as b) and vice versa).

Appropriate correction is required.

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Claim 17 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 17 fails to further limit claim 16. That is, claim 16 is a method, and claim 17 does not advance or otherwise further limit any steps in the method and it therefore not given any patentable weight.

***Claim Objections - 37 CFR 1.75(d)(1)***

6. The following is a quotation of 37 CFR 1.75(d)(1):

The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

7. Claim 8 is objected to under 37 CFR 1.75(d)(1), as failing to conform to the invention as set forth in the remainder of the specification. The "suspend" feature referred to in this claim is not disclosed in the specification. Appropriate correction is required. It is suggested that the applicant should add this element back to the specification without adding new matter.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1–3, 6-10, 12-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chau et al. (US 5,879,698 A) and Silver et al. (US 5,481,712 A).

Regarding claim 1, Chau teaches an apparatus and method:

acquiring an image including an extraneous feature ("a sample image is acquired", Chau, column 2, line 36);

identifying extraneous feature pixels at least in the region of interest; and

performing the one or more operations associated with the video tool,

excluding the identified extraneous feature pixels from at least one

operation associated with the video tool, at least in the region of interest.

("a final image having only macro defects, if any, is produced", Chau, column 2, line 45).

Chau does not teach:

defining a region of interest associated with a video tool provided by the user interface, the video tool having one or more associated operations;



Silver teaches defining a region of interest associated with a video tool provided by the user interface, the video tool having one or more associated operations ("Measurements performed on the digital image can be performed on selected regions of interest", Silver, column 7, line 40, "the graphical input element 212 superimposes a manipulable marquee/box over the candidate image, thereby permitting the operator to designate the region of interest", Silver, column 5, line 38) and "the machine vision tools include machine vision analyses, geometric constructions built from them, and/or automation controls", Silver, column 7, line 34)

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the vision tools and associated ROI capability of the vision system of Silver with the edge removal method of Chau. ROIs to specify the portion of the image to operate on ("designation of a portion of image in which that tool is to operate", Silver, Column 5, line 37). Additionally, the use of ROIs would reduce the overall processing load of the system improving system performance. The use of the video tools to provide the processing capability that Chau indicates is needed to identify defects ("the automated image processing can be accomplished using a general purpose computer with appropriate program routines or by using a specialized image processing system with other appropriate program routines", Chau, column 2, line 67 and Chau, steps 260 and 270 in Fig. 2)

Regarding claim 2, Chau teaches the extraneous feature comprises at least one of a) a grid-like feature, and b) a grid-like feature of a flat panel display screen mask (Fig. 3, Chau)

Regarding claim 3, Chau describes image data corresponding to pixels in the region of interest that are not the identified extraneous feature pixels are not modified before performing the one or more operations associated with the video tool ("a difference image created where edge enhanced scattering effects present in both the template and the enhanced sample image are essentially eliminated" Chau, column 2, line 39).

Regarding claim 6, the combination of Chau and Silver described above does teach that the extraneous feature pixels are identified only in the region of interest in that the ROI is used to specify the portion of the image to operate on.

Regarding claims 7, 12 and 20, the system disclosed by Chau includes a mode of operation wherein operations usable to identify extraneous feature pixels are activated, and the user interface comprises at least one control widget usable to activate the mode of operation. Chau's describes his system as having a "training phase" (Chau, column 3, line 57) and a "detection phase" (Chau, column 4, line 39). Such a system will by necessity have control elements to activate each mode (phase) and to indicate it's current mode.

Regarding claim 8, the combination of Chau and Silver above does provide a machine vision system with user interface as required above, the combination does not expressly teach a user interface that includes at least one feature that is usable to suspend the mode of operation of the machine vision inspection system wherein operations usable to identify extraneous feature pixels are activated.

However, it is well known in the art to provide software running on a computer based systems with the ability to pause or terminate processing; e.g., the ability to close the software (Official Notice). It is also well known to provide the operator with the ability to power down the computer, even when software is running and will be interrupted (Official Notice).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the system of the Chau and Silver combination, with the well known ability to suspend operations as described above to pause or stop the software so that other software operations can be performed, or to power down or reset the computer system.

Regarding claims 9 and 21, The vision tools of Silver, included in the combination above teach an apparatus and method where the region of interest defining portion is usable to define the respective region of interest based on a graphical operator-configurable region of interest indicating widget corresponding to the respective video

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tool (Silver, Figure 2, where reference 216 is a marquee selection box for defining an ROI), and the at least one feature that is usable for at least one of a) and b) is associated with the respective video tool and the at least one feature comprises at least one of a) a mode status indicating feature and b) a mode control widget (Silver, Figure 2, reference 204 shows the logical structure and flow for defining and adjusting parameters associated with a graphical vision tool).

Regarding claim 10, Chau teaches using thresholding techniques to identify regions corresponding to extraneous feature pixels ("thresholded difference image 240 is essentially an array of pixels where macro defects are represented as pixels", Chau, column 5, line 8) and morphology techniques to filter anomalous portions of the boundaries of the identified regions ("The morphological operation of optional Step 250 filters image 240 to eliminate clusters (contiguous groups) of pixels that do not represent true macro defects, while leaving intact those that do" Chau, column 5, line 21).

Regarding claims 13 and 22, the combination of Chau and Silver described above teach the apparatus and method of Claims 1 and 18, wherein the extraneous feature identifying portion comprises predetermined extraneous feature pixel identification operations (described above in the paragraphs dealing with claims 1 and 18), and the user interface includes features usable by an operator to determine at least one of S1) at least one subset of the predetermined extraneous feature pixel identification operations, to be applied to the workpiece image, and S2) at least one

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parameter that governs a predetermined extraneous feature pixel identification operation to be applied to a workpiece image (Silver, Figure 2, reference 204 shows the logical structure and flow for defining and adjusting parameters associated with a graphical vision tool), and the extraneous feature identifying portion identifies extraneous feature pixels based on the operator determination of at least one of S 1) and S2)

Regarding claim 14, The combination of Chau and Silver described above teach the method of Claim 13, wherein identifying extraneous feature pixels at least in the region of interest comprises: identifying a set of extraneous feature pixels according to the operator selection of at least one of S 1) and S2) (as discussed above for claim 13); providing a display of the identified set of extraneous feature pixels superimposed at their proper locations on at least a portion of the original inspection image such that they are easily distinguished; and the operator approving the identified set of extraneous feature pixels based on the display, wherein the operator approval takes place prior to performing the one or more operations associated with the video tool ( Chau, Figure 1, Step 140 is a decision block where the operator may determine if additional references are needed and either stop or continue training, "if additional training is desired to account for acceptable process variations, branch 128 is followed and another reference image, Step 130, acquired.", Chau, column 4, line 12).

Regarding claim 15, the combination of Chau and Silver, in the vision tools of Silver, teach the method of Claim 14, wherein the method is performed during a training mode of operation of the machine vision inspection system and when the operator approval takes place prior to performing the one or more operations associated with the video tool, machine control instructions corresponding to the operator selection of at least one of S1) and S2) are in a part program for automatically inspecting the workpiece (Silver, Figure 2, references 230 and 234, graphical manipulation of video tools results in the creation and modification of executable code, and "Once the operator has specified the input parameters, the update element 230 generates modifies (sic) the stored program to include in the call to the requested machine vision tool, e.g., LINE FINDER, the designated input parameters." Silver, column 5, line 46).

Regarding claim 16, Chau teaches a first set of operations used for identifying extraneous feature pixels at least in the region of interest are performed prior to beginning a second set of operations used for performing the one or more operations associated with the video tool (Fig. 2, Chau, elements 210 – 255 occur first and deal with identifying and removing extraneous edge features, elements 260 and 270 correspond to defect analysis on non-extraneous pixels and occur afterwards).

Regarding claim 17, wherein in the source code of a program used for controlling operations of the machine vision inspection system, program instructions for performing the first set of operations (identifying extraneous features) are not

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interspersed with program instructions for performing the second set of operations (Operations associated with the video tool), Fig 2 in Chau, as described above, shows the structure of the program where the code identifying extraneous features is separate from the defect detection code.

Regarding claim 18, the combination of Chau and Silver described above teach:  
a user interface usable to define a set of operations usable to inspect a workpiece image ("Thus, when the operator selects a machine vision tool (through a menu choice), the DS 320 sends a request via data pathway 318 to the VP 330 for its creation, records the information that results from that creation, and gives the tool a default name so it can be listed in the variables display." Silver, column 6, line 44);  
an image acquisition portion usable for acquiring a workpiece image that includes  
an extraneous feature (Chau, figure 2, Step 200)

a region of interest defining portion usable to define a respective region of interest in the acquired image,  
the respective region of interest corresponding to a respective  
video tool of a type provided by the user interface,  
the video tool having one or more associated operations ("designation of a portion of image in which that tool is to operate", Silver, Column 5, line 37, and "the machine vision tools include machine vision analyses, geometric constructions built from them, and/or automation controls", Silver, column 7, line 34); and

an extraneous feature identifying portion usable to identify extraneous feature pixels at least in the respective region of interest,

wherein,

when the extraneous feature identifying portion is used to identify extraneous feature pixels at least in the respective region of interest of the workpiece image, the machine vision inspection system is operable to perform the one or more operations associated with the respective video tool and exclude the identified extraneous feature pixels from at least one operation associated with the video tool (Chau, Fig. 3, where the sequence shown illustrates identifying extraneous features and removing them from the image to simplify defect detection and "a difference image created where edge enhanced scattering effects present in both the template and the enhanced sample image are essentially eliminated. Again, applying one or more automated image processing techniques, for example GTC thresholding, morphological transformations and blob analysis, macro defect detection can be further improved. In this manner, a final image having only macro defects, if any, is produced." Chau, column 2, line 37).



Regarding claim 19, the combination of Chau and Silver discloses the extraneous feature identifying portion is used to identify extraneous feature pixels included in the respective region of interest, the machine vision inspection system automatically excludes the identified extraneous feature pixels from at least one operation associated with the respective video tool (Chau, Figure 3, which illustrates an image to be analyzed for defects after extraneous features have been removed and A difference image is formed by comparing the edge enhanced reference and sample images. The difference image is evaluated using one or more automated image processing techniques such as thresholding, morphological transformations and blob analysis to identify macro defects." Chau, Abstract, line 6).

10. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chau and Silver as applied to the claims above, and further in view of Petry III et al. (US 6,859,923 A).

Regarding claim 4, the combination of Chau and Silver does not describe identifying a first set of pixels estimated to correspond to the extraneous feature; determining a second set of pixels that comprise a buffer region adjacent to at least some of the pixels of the first set; and including pixels corresponding to the first and second sets in the identified extraneous feature pixels.

Petry working in a related problem solving area of mark defect analysis describes "The mark background region 64 and the character background regions 70, less a padding factor two pixels wide around the ink, form the defect analysis masks for the backgrounds." Petry, column 6, line 56 and figure 3D.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the defect analysis mask technique of Petry, in particular the background mask, to accommodate variation in the edge enhanced scattering effects between the reference and sample images ("slight changes in the inked regions are measured when inspecting using the ink mask and not when inspecting with the background mask" Petry, column 6, line 50).

Regarding claim 5, the above combination of Chau, Silver and Petry, in the defect analysis mask technique of Petry describes determining the second set of pixels comprises performing at least one dilation operation on the first set of pixels ("the ink masks are dilated by a padding factor and background masks are eroded by the same factor", Petry, column 6, line 48).

***Allowable Subject Matter***

11. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The following are statements of reasons for the indication of allowable subject matter in the claims listed above:

Regarding claim 11, the prior art of record does not teach characterizing a nominal geometric feature corresponding to at least one portion of the extraneous feature based on a apriori knowledge of the workpiece; or identifying pixels corresponding to the located nominal geometric feature as extraneous feature pixels.

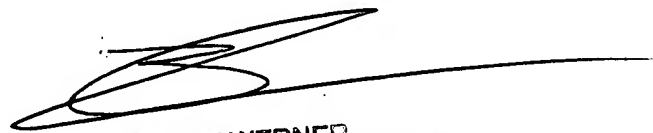
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TMR



**BRIAN WERNER**  
**SUPERVISORY PATENT EXAMINER**